PRECAUTIONS TAKEN FOR STEEL WORKERS

Continued from Second Page.

the same relative height. At all points on engine beds where the oiler may have occasion to walk railings or plate guards are provided. The governor balls are guarded. The governor is driven by a three rope drive, dependence not being placed on a single rope or belt. A device has been installed which will show when a strand in a rope of a rope drive is broken. The broken strand strikes a board hinged to the pulley guard, throwing the board back and attracting the attention of the engineer.

ELECTRIC CRANE UNDULY BLAMED.

The statement has been made that 50 per cent. of electrical accidents are chargeable to the overhead electric crane. This is not borne out by our records. However, our guarding of these cranes and our operating rules are quite elaborate. All overhead cranes are provided with railed walks on both bridge girders extending the entire length of the crane. The trolley or carriage is entirely floored and provided with a railed walk. Each hoist is equipped with an over hoist limit switch which prevents running the blocks into the drum, probably breaking the cable and dropping the load on the workmen.

Each crane has a safety switch installed on the bridge which will cut off all power, making it impossible for an absent minded operator to forget that men are working above and start the machinery from the cab. When a man goes on top of a crane he pulls out this switch and puts his "Danger—Do Not Move" sign on it. A box is provided on the crane bridge in which to keep oil cans, tools, &c. Each crane is equipped with guards extending out from the truck wheels, the purpose being to warn a person resting his hand on the rail of the approach of the crane, which he might fail to note because of other noises. The number of arms and hands lost by persons working on scaffolds along crane runways thoughtlessly resting against the runway and failing to notice the approach of the crane is appalling. Four instances have come to my attention during the past year where these wheel guards have prevented such accidents. All trolley gears and the truck drive gears are guarded. The flooring over the trolley carriage is important, both from a safety standpoint and from an operating point of view. It prevents the falling below of pieces of machinery and makes a good repair platform. Where ladders have to be used in getting to and from cranes a landing platform is provided at the top of the ladder, with a short ladder leading from the platform to the cage. This prevents a man climbing the main ladder so high that he can take hold of the power rails. Where possible stairs are provided. Where practicable steel walks with proper railings and toe boards at the base of the railings are placed parallel with all crane runways. This is not only an important safety precaution, but is of great assistance in operation. All gantry cranes are equipped with fenders over the truck wheels, a walk the entire length of the crane bridge and a safety switch on top of the bridge and with automatic warning bells.

All switchboards carrying a voltage of over 250 are encased, making it impossible to accidentally come in contact with the live parts. The guard on the front of the board is semicircular, with the handle projecting through it. The fuse blocks are covered with an asbestos lined steel box. The back of the board is covered with a plate and all guards are grounded to the board, which in turn is grounded. Each board of this type is equipped with disconnectors, making it possible for the board to be rendered "dead" when it is necessary to work on it.

The danger of being caught between a locomotive crane boiler and the truck frame as the crane boom is swung back and forth may seem remote, but reports show that such accidents do occur. A device has been installed on the truck frame consisting of a fence which guards the danger zone while the crane is working, but can be folded against the frame when the crane is running through the yard.

Where a railroad track runs close to a building railings are placed at the corners of the building to prevent men suddenly stepping from the building on the tracks. Where there is a narrow space between the building and the track in which a man might attempt to stand as a car is moving by and be crushed by the cars and it is impossible to get a safe clearance by throwing the track over an inclined plate is placed over this space, making it impossible for a man to get in this dangerous position.

In the guarding of valve pits and trap doors the Barnhart cover is so devised that three sides of the hole are guarded when the cover is up. The rods drop down out of the way when the cover is closed.

When men are working on or about cars the necessity of placing a danger signal to protect them is obvious. A warning sign or track flag devised by the National Tube Company is so constructed that it cannot be blown down, being clamped to the rail; nor can it be knocked down by a car and the claim made that it was not in place, as the resulting wreck of the sign will show that it was in position. Cleanliness about the shop and yards cannot be too strongly urged, as there is no question as to its being a factor in causing the men to be more cleanly about their work and in preventing accidents due to cluttered up or untidy conditions.

STANDARDIZING SAFETY MEASURES.

The central committee of safety of the Illinois Steel Company is engaged in standardizing safety measures and devices. After careful consideration it adopts and recommends for use at all plants of the company such devices as seem to be most efficient and likely best to prevent accidents. A book of plans for devices for safety has been prepared under the direction of this committee for the purpose of standardizing the safety appliances and precautions necessary to protect employees from the dangers incident to machinery and unsafe working conditions and to secure the provisions of efficient safeguards and proper working conditions at the time construction work is planned and machinery is installed, as well as to show the conditions to be maintained during operation. This book has been prepared in loose leaf form so that additions or amendments may be readily made to it. The plates in this book are reduced drawings of actual construction and are intended to be used by the engineering department as examples only. The dimensions shown are not required to be followed unless they are made obligatory in the text of the specifications which appear upon the page opposite to each plate. The descriptive matter is taken from the construction rule book, which will be mentioned later, and incorporates all of the requirements (in an abbreviated form) appearing in that book.

On all plans or specifications for new construction or work by way of replacement it must be shown that a check has been made for safety, and it has been made the duty of superintendents of plants to see that safety devices and precautions provided for in the book of standard safety devices are complied with before machinery or plants are put into operation and that they are thereafter maintained. No new machinery or new plant may be put into operation unless it has been first approved for safety by the safety inspector, except upon the specific order of the general superintendent or assistant general superintendent of the plant. No machine tools may be ordered unless it has been shown that the plans and specifications therefor have been checked for safety.

This committee has also prepared with great care a book of rules respecting safety in operation. This book is got out in two forms. The first for the use of superintendents and foremen, printed in the English language, includes general instructions from the president of the company, regulations respecting cooperation of workmen, rules governing the construction and installation of machinery and the physical conditions to be maintained (which cover the same subjects as those mentioned before as being covered by the book of Standard Safety Devices), and operation rules for the safety of employees. The second, for the use of employees, printed in the several languages spoken by the employees, is distributed to all employees of the company who are not superintendents or foremen, and contains the same matter as the other form except that the rules governing the construction and installation of machinery, &c., are omitted.

These rule books, as stated, are placed in the hands of all employees of the company and each employee is required to read the same and to satisfy his foreman that he has read it and is familiar with its contents, and both the foreman and employee are also required to sign a statement to that effect upon a form provided for that purpose. All men when placed at work upon new jobs entailing any hazard at all must be fully instructed by the foreman in charge as to all dangers incident to the work, and when the foreman is satisfied that such workman understands and is aware of all such dangers he is required to so certify to the department superintendent upon a form provided for that purpose, upon which form the workman also states that he has been instructed, knows the dangers and will be careful of his own and others' safety. The signing of such statements practically insures against perfunctoriness in these details. The safety committee has also prepared and had printed rules governing the use of high explosives, copies of which rules are placed in the hands of all persons having anything whatever to do with the handling of dynamite or other high explosives.

TEACHING HABITS OF CAUTION.

Contemporaneously with the organization of the United States Steel Corporation safety committee and to the end that the greatest benefit from individual experience might be obtained, a central committee of safety was some three years ago organized. This committee consists of the safety inspector and assistant general superintendent of each of its plants, together with the general attorney, who acts as chairman of the committee, his assistant in charge of accident matters in the law department, manager of safety and relief department, who acts as secretary of the committee, and a stenographer, who takes a record of all the proceedings of the committee. This committee meets at the main office of the company at Chicago once every month for an all day meeting. At these meetings all accidents occurring at the several plants of the company which are in any wise serious in their results are discussed, and ways and means devised for the prevention of the occurrence of similar accidents at the same or other works wherever this is possible. General conditions are likewise examined into, and if, in the observation of any of the members of the committee, any safety precautions or devices seem to be desirable or necessary the committee considers them and makes appropriate recommendations. The recommendations of this committee are accepted and put into force at all plants without question unless some special circumstances make it impossible to do so.

In considering the questions that come before this committee it does not depend solely upon the judgment of its members, but it is the practice of the committee to obtain the advice and judgment of the men of its several works who are specialists upon the particular branch of the work that may be involved in the question under consideration. All matters that are considered, except possibly some minor ones, are first made the subject of discussion and consideration at meetings of the department superintendents at the several plants, and are gone into by the members of the committee at each plant very carefully and thoroughly with the heads of the departments in which the particular situation may exist and are also gone into, where possible and advisable, with special committees, such as of blast furnace superintendents or chief electrical engineers, &c., and the permanent and workmen's committees, which will be mentioned later. All of this is done for the purpose of obtaining the very best judgment that is available in the consideration of the more important questions that come before the committee and to the end that, when any action is taken and a recommendation made by the committee, it may be sure that the best results will be obtained. This procedure of conferring with the department heads and others at the several plants also aids much in facilitating the early installation of any device that may be decided upon, as the same are more often than not the result of the thought of the men themselves.

The statistics of foreign countries, as well as those of the United States, show that the large majority of accidents is due to a lack of care on the part of those injured or on the part of those with whom the injured was working, and I believe we will all agree that the acquiring of habits of caution is the secret to success in this work.

SAFETY COMMITTEES OF MEN.

One of the first steps taken by the central committee of safety to interest the men and assist in inculcating habits of caution into their minds was the organization of safety committees at all the plants of the Illinois Steel Company. Two plans have been followed in this work, namely, the organization of committees composed of foremen, known as permanent safety committees, and the organization of committees composed entirely of workmen below the grade of foremen, called workmen's safety committees.

Each department has a committee of foremen known as the permanent safety committee, because the personnel of the committee does not change. It is the duty of this committee to make monthly inspections of their department as a committee. It is also their duty to see that all safety devices approved by their superintendents are installed, and to investigate all accidents where the injured man loses ten days time or more, or where there is some special feature in the case. In making this investigation they report how the accident occurred, what they think can be done to prevent a similar accident, whether in their opinion any one has been negligent and what they think should be done with the negligent person.

This inquiry into the alleged guilt of an employee by a "jury of his peers" has had a very beneficial effect and has done much toward reducing the number of accidents. Care is taken by the superintendents to see that the investigations made by the committees are not merely perfunctory, and their reports have been very satisfactory. Where the injured man has been careless the committee does not overlook this fact, but lets him understand that it does not approve of his actions.

The plants are divided into divisions, each consisting of three departments or mills. One workman is chosen from each department to act as a member of the committee, to inspect for dangerous places, to consult with the men at their work and get suggestions from them as to safety methods of doing that particular work, and incidentally, to sow seeds of caution. These men serve on the committee one month and spend one day each week inspecting their division.

When a committee is organized all of the superintendents of the departments making up that division meet with the committee and the safety inspector and the nature of the work is gone over with the committee, impressing upon them the interest taken in the work by their superintendents. We believe that this committee work is causing the men to take more of an interest in their own and others' safety. The men are urged not to drop the work after their term on the committee has expired, but to continue to report any change that they think would be beneficial, and it is a pleasure to note that many of the men continue to make suggestions. The superintendents advise that it also has caused other men who have not served on a committee to come to them with suggestions. In directing the work of the committees we have inter-division and inter-works inspection, having a committee inspect a division or a plant other than its own, thereby creating a rivalry among the men and at the same time giving the work greater importance in their eyes and making it more of an honor to be selected as a committeeman.

SAFETY BULLETIN BOARDS.

As a further assistance in the inculcation of habits of caution in each department and at each plant entrance are installed safety bulletin boards. Upon these boards are displayed the list of departments successful in keeping in the "Booster Class" during the past month, i. e., the departments that have kept their accidents below a certain percentage. Clipping bureaus supply the plants with newspaper reports of industrial accidents occurring throughout the United States, and these clippings are posted on the boards, together with rules and photographs of devices of the Illinois Steel Company which would have prevented the accident. In addition to this is posted any other matter or photographs which will attract the attention of the men and keep them interested in safety.

Another stimulant to the advertising of safety is the distribution of cigars with the "Boost for Safety" bands. Boxes of these cigars are distributed among the foremen and workmen whenever records are made in keeping down accidents or when suggestions for safety are made or whenever it appears that the giving of cigars will help the cause along.

"Boost for safety" paperweights are presented to the foreman and workmen, the idea being to keep always before them the fact that the safety of workmen is the first consideration.

The plant managements have caused to be made a badge of distinction which is presented to each man showing a thorough knowledge of the safety rules. The workmen, as well as foremen, compete for these badges. It is, however, compulsory upon a foreman to take an examination on the rules and precautions governing the prevention of accidents. In order to obtain a badge it is necessary that an examination be passed with an average of at least 90 per cent. efficiency. This move is not only insuring a better knowledge of safety rules and precautions on the part of the foremen and workmen, but the eagerness with which all classes of workmen are competing for the buttons and the pride shown by those successful in obtaining them has proved it to be a valuable aid in the inculcation of habits of caution into the minds of the men.

A very natural question, in view of what has been said as to organization and safeguarding work, is—what has been its effect? While satisfactory statistics are not available at all of the plants of the corporation from which a comprehensive comparison can be made, the effect of the work at the Illinois Steel Company is a fair example of what this character of work will do. From these statistics we find that serious accidents have been reduced since the energetic safety campaign has been instituted by 50 to 66 2-3 per cent.

IN THE MUSEUM OF SAFETY.

Many of the Appliances Shown Are for Benefit of Steel Workers.

One strolling through the American Museum of Safety notices the number of safety appliances exhibited by the iron and steel corporations. Among others is a new planing device which eliminates the danger that workmen previously ran in losing their fingers, a new style link in the heavy chains to prevent the latter from breaking, a safety platform attached to the travelling cranes, and numerous safeguards on running machinery.

The members of the iron and steel section of the museum include practically all the iron and steel concerns of the country of any note, such as the American Iron and Steel Manufacturing Company, Lebanon, Pa.; the American Rolling Mill Company, Middletown, Pa.; American Steel Foundries, Chicago, Ill.; Burden Iron Company, Troy, N. Y.; Cambria Steel Company, Johnstown, Pa.; Colorado Fuel and Iron Company, Denver, Col.; Columbus Iron and Steel Company, Columbus, Ohio; Eastern Steel Company, New York; Empire Steel and Iron Company, Catasauqua, Pa.; Follansbee Bros. Company, Pittsburg, Pa.; Inland Steel Company, Chicago, Ill.; Interstate Iron and Steel Company, Chicago, Ill.; Jones & Laughlin Steel Company, Pittsburg, Pa.; Lackawanna Steel Company, Buffalo, N. Y.; Lukens Iron and Steel Company, Coatsville, Pa.; La Belle Iron Works, Steubenville, Ohio; Lockhart Iron and Steel Company, Pittsburg, Pa.; Maryland Steel Company, Sparrows Point, Md.; Midvale Steel Company, Philadelphia, Pa.; Pennsylvania Steel Company, Steelton, Pa.; Phillips Sheet and Tin Plate Company, Weirton, W. Va.; Picands, Mather & Co., Cleveland, Ohio; Pittsburg Steel Company, Pittsburg, Pa.; Reading Iron Company, Reading, Pa.; Port Henry Iron Ore Company, N. Y.; Republic Iron and Steel Company, Pittsburg, Pa.; Rogers, Brown & Co., Buffalo, N. Y.; Seneca Iron and Steel Company, Buffalo, N. Y.; Sharon Steel Hoop Company, Sharon, Pa.; Spang, Chalfont & Co., Inc., Pittsburg, Pa.; United States Steel Corporation, New York; United Steel Company, Canton, Ohio; Wheeling Steel and Iron Company, Wheeling, W. Va.; Whitaker Glessner Company, Wheeling, W. Va.; Witherbee, Sherman & Co., New York; Youngstown Sheet and Tube Company, Youngstown, Ohio, and the Youngstown Steel Company, Youngstown, Ohio.

Mr. Tolman, director of the museum, stated that the last few years have seen a wonderful awakening in the attitude of the public toward making industry less dangerous. Speaking of the dread mortality in the peaceful industries he said that a conservative estimate places the casualties at 500,000 yearly, and that unless we treat this subject scientifically as in other countries we will find ourselves overwhelmed. Mr. Tolman is often requested by large corporations to give data as to the strides that have been taken in the invention of devices to reduce casualties.

"The layman, in the luxury of the parlor car, gives no thought to the equipment of the track, or, if he does, assumes that it is all right," he explains. "A feat achievement in actual road service was a train of 120 cars, carrying 6,450 tons of coal, drawn by a single freight engine of the most approved type. The total load was 8,850 tons, and was pulled 150 miles at an average speed of thirteen miles an hour. The length of the train from the pilot of the locomotive to the rear platform of the cabin car was nine-tenths of a mile. A telephone connected the engine and the cabin car, enabling the engineer and the conductor to be in communication all the time.

"Safety and facility in travelling demand the highest skill in maintaining and operating signals and interlocking appliances. To train an elite signal corps, schools, in this important branch are being opened, with a three years course. In mechanics with repair and construction gangs the first year, the second year in office work, and the third year in outside practice on electric and electro-pneumatic appliances."

Apropos of a recent address to the employees of a large steel corporation, Mr. Tolman spoke as follows on the subject of "First Aid":

"Crowds collect in the city street around some unfortunate lying in agony on the pavement. Every one makes vague suggestions as to what should be done, but no one does anything until the policeman arrives. Then he only telephones for an ambulance. By the time that this arrives from twenty minutes to an hour has elapsed, and unless a doctor happens to be passing and offers his services nothing has been done for the sufferer. As a result of this delay he may be one of those who die in the ambulance or shortly after reaching the hospital. Many people lose their lives every year from injuries that would not have proved fatal if properly treated a short time after being sustained.

"It is ignorance of what to do in emergencies, apparently so appalling, that makes people merely gape in pitying curiosity. Ignorance sometimes makes the efforts of well meaning individuals who rush to the rescue and do the wrong thing even more harmful. To protect employees from such needless fatalities the large corporations now instruct their men in first aid to the injured.

"Lectures are given by a medical examiner, with demonstration of the proper way to treat all common accidents, such as breaks, cuts, burns and electric shocks. To supplement these lectures a concise pamphlet covering all important points is issued.

"It is always essential that one person should take charge of proceedings in order to avoid confusion. The first statement in the pamphlets is 'The person in authority should take charge and then keep cool.'

"The next thing is to send for a physician. Keep the crowd away to insure plenty of fresh air. Examine the injuries carefully before doing anything. Don't touch open wounds with the hands. Don't attempt to remove dirt or apply unclean dressings of any kind, as infection may be introduced by so doing.

"The booklet then gives an explanation as to how to use the stretcher, which is always accessible. Next a description of the contents and use of the various articles in the first aid pocket. After this the specific injuries, hemorrhage, fracture, burn, shock, unconsciousness, fits, heat exhaustion and sunstroke, are discussed and the proper treatment explained.

"At the lectures the men are shown how to make use of a newspaper and a piece of scantling for splints, as it is recognized that in many cases there will be few facilities at hand for caring for the injured and therefore directions are given for making use of such things as are always readily accessible.

"A part of the teaching is the proper way to lift an injured person to a stretcher, adjusting a string with a triangular bandage; emergency treatment of injuries to the scalp and methods of bandaging.

"The men are enthusiastic, realizing that they may be called on at any time to administer to a fellow workman. As a result of this teaching there is rarely a case of injury in any of the plants which is aggravated either by lack of care or by misdirected care before medical attention can be secured.

"If we constitute ourselves a safety committee on a tour of inspection around the plant, we will see that the overcrowding of the machines, with such narrow space between the tools, brings many a workman needlessly within the danger zone of injury from the moving parts. Observe, however, the number of common sense 'homemade' safeguards that have been introduced for the protection of the men.

"A simple but effective pipe iron railing encloses the planer pulley drive. Another type of a metal box shield is drawn around the moving parts of a motor drive.

"The main gears and pinions of big shears are particularly vicious, but their jaws are muzzled by guards and rails.

"For the planer an automatic guard springs back after the wood has passed by, covering the revolving cutter. Being attached to the table it cannot be laid aside by the careless or indifferent workman. The circular saw is enclosed by guards of wood above and metal below, hinged so as to give inspection at all times of the moving parts, and facility in making any desired adjustments.

"The end of the spindle on the jib crane is provided with a twist collar to prevent the twisting of the cables or chains. To prevent arms or legs from obstructing the bed of the planer the bed is covered with metal and a guard at the end so that passing workmen are not struck.

"Hammer heads and bars whose ends are worn over, so that bits of steel are liable to fly off, are daily the cause of accidents in some cases minor, it is true, but again serious, as in the case of the workman whose left eye was knocked out by a steel chip from the end of a worn down hammer. A special committee is appointed, whose vigilance in examining the heads of these tools must be eternal.

"In connection with the strenuous efforts now put forth by the iron and steel corporations to minimize casualties among their employees a concrete example of the result attained is shown by the fact that the United States Steel Corporation reduced the number of serious accidents from eight and seven-tenths per thousand employees in January, 1911, to three and five-tenths in November of that year.

"The International Congress for the Prevention of Accidents and Industrial Hygiene, which will be held in Milan, Italy, May 27 to June 1, 1912, will devote a large portion of the meeting to the dangers still existing in the iron and steel plants and will seek for technical solutions and practical applications tending toward their relief.

"It is interesting to note that the medal awarded by the Travellers Insurance Company to the American employer, manufacturer or other corporation which, in the judgment of the jury of award of the American Museum of Safety, has during a recent period of years done the most or achieved the greatest for the conservation of the lives and limbs of workmen by means of safety devices for machines and processes was in 1910 awarded to the United States Steel Corporation."